DOCUMENT RESUME

ED 387 001 HE 028 582

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TITLE The Long Term Effects of Undergraduate Student Involvement Experiences on Selected Outcome Measures. AIR 1995 Annual Forum Paper.
PUB DATE May 95
NOTE 23p.; Paper presented at the Annual Forum of the Association for Institutional Research (35th, Boston, MA, May 28-31, 1995).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Bachelors Degrees; *Career Choice; *Doctoral Degrees; *Educational Attainment; Higher Education; *Institutional Research; Longitudinal Studies; *Outcomes of Education; Predictor Variables; Professional Education; Statistical Analysis; Student Development; Student Participation; Undergraduate Study
IDENTIFIERS *AIR Forum

ABSTRACT

The long-term effects of undergraduate involvement on advanced degree attainment and career choice were studied. The longitudinal study involved 299 freshmen who entered college between 1973 and 1976 and participated in the institutional research program's followup questionnaire 17-20 years later. Astin's Input-Environment Outcomes model and multivariate analysis with temporal sequencing were used to control for various input-background characteristics so that the effects of selected undergraduate and post-college involvement variables could be assessed. The concept of "channeling" is used to explain some of the mediating effects of post-college outcomes such as graduate or professional school attendance, marriage, or early employment. The student's chances of obtaining an advanced degree after college appear to be enhanced by interactions with faculty, academic achievement, and academic involvement. Obtaining an advanced degree channeled men away from business careers, while women who went to work immediately after graduation were more likely to pursue business careers. The results suggest that the theory of involvement is applicable over relatively long time periods, and that it can and should be extended to incorporate various forms of post-college involvement. (Contains 15 references.) (SW)

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The Long Term Effects of Undergraduate Student Involvement Experiences on Selected Outcome Measures

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This paper was presented at the Thirty-Fifth Annual Forum of the Association for Institutional Research held at the Boston Sheraton Hotel & Towers, Boston, Massacusetts, May 28-31, 1995. This paper was reviewed by the AIR Forum Publications Committee and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC Collection of Forum Papers.

Jean Endo
Editor
AIR Forum Publications

The Long Term Effects of Undergraduate Student
Involvement Experiences on Selected Outcome Measures

Abstract

This study examines the long term effects of undergraduate involvement on advanced degree attainment and career choice. Alexander Astin's Input-Environment-Output model and multivariate analysis with temporal sequencing are used to control for various input/background characteristics so that the effects of selected undergraduate and post-college involvement variables could be assessed. The concept of "channeling" is used to explain some of the direct and indirect effects of independent variables on the selected outcome measures.

The results suggest that the theory of involvement is applicable over relatively long time periods, and that it can and should be extended to incorporate various forms of post-college involvement.

Background

There is a considerable body of knowledge related to the effects of college on undergraduate students. Feldman and Newcomb (1969) reviewed over 1,000 studies in their now classic book, *The Impact of College on Students*. Pascarella's and Terenzini's (1991) update of Feldman's and Newcomb's work is even more monumental. After spending four years documenting over 2,600 studies in their book, *How College Affects Students*, they report that one of the major findings from their comprehensive review was the importance of student involvement (Pascarella and Terenzini, 1992).

In their discussion of student involvement as being a key to learning, Kuh and Associates (1991) point out that "the importance of involvement to learning and personal development was emphasized by The Study Group on the Conditions of Excellence in American Higher Education (1984, p. 17): 'Perhaps the most important [condition] for improving undergraduate education is student involvement . . . the more time and effort students invest in the learning process and the more intensely they engage in their own education, the greater will be their growth and achievement, their satisfaction with their educational experiences, and their persistence in college, and the more likely they will continue their learning'" (p. 10).

Much of the student effects research is based on the four to five year time frame covered by the "undergraduate years." Long term longitudinal research (greater than 10 years), focusing on the effects of undergraduate student involvement (such as living on-campus versus commuting and being involved in extracurricular activities) on cognitive and affective outcomes, is limited.

Consequently, there is a paucity of knowledge related to the permanence of the effects of undergraduate student involvement variables and the subsequent influence of post-college involvement variables on long-term outcome variables such as advanced degree attainment and career choice. This study is interested in not only analyzing which of the undergraduate involvement experiences retain their predictive strength over time, but in extending the knowledge of how these long term outcomes are affected by post-college "involvements."

Statement of the Problem

In addition to the interest and concern about the student's success in obtaining an undergraduate degree, there is also a need to be concerned with the long-term success of college graduates. With the ability to hold a large number of potential biasing variables constant, this study hopes to gain insights into the influence of post-college variables and their significance in predicting outcomes over the long term.

Purpose and Scope of the Study

The purpose of this study is to analyze the long term effects of undergraduate student involvement and to determine how these effects might be mediated by post-college involvement experiences. The study will use Astin's Taxonomy of Student Outcomes, which incorporates a time dimension to facilitate long term studies. The taxonomy is structured around two dimensions: cognitive versus affective outcomes and psychological versus behavioral data (Astin, 1977, 1993).

The study will be longitudinal in that it will be a 17-20 year follow-up of freshmen who entered college between 1973 and 1976 and completed the Cooperative Institutional Research Program (CIRP) questionnaire during the respective fall terms. The follow-up study will produce data not only on the long-term outcome (dependent) variables, but also on a range of post-college involvement or potential "channeling" variables, such as, post-baccalaureate degree attainment, marriage, child-bearing, and early career choice.

Characteristics of the Sample

Initially it was possible to identify 558 Pepperdine University alumni who graduated between 1976 and 1981 and participated in the CIRP survey as 1973, 1974, 1975 and 1976 freshmen. Of this original cohort, 299 or 54 percent completed the follow-up questionnaire. The 299 respondents included 160 women and 139 men. It is important to remember that the approach used for this study provides a one-for-one match for the cohort group as freshman with their follow-up responses 17 to 20 years later. The ability to control input and background

variables obtained from the freshman CIRP questionnaire makes it possible to more accurately determine potential causal relationships between the independent variables and the dependent variable under study.

Review of Literature

College Impact Models: Astin's (1985) Theory of Involvement is one of several college impact models prominent in higher education research. Tinto's Theory of Student Departure (Tinto, 1987) is concerned primarily with attrition--why students drop out of college. Like Astin's Theory of Involvement, the involvement of the student--or her/his *integration* with the various aspects of the institution--contribute to the student's chances for success, that is, obtaining a bachelor's degree. Pascarella's general model for assessing change differs from Tinto's model in that it is more conducive to "multi-institution studies of collegiate impact" (Pascarella & Terenzini, 1991, p. 53), whereas, Tinto's model is more intra-institutional.

This study employs Astin's Theory of Involvement, for several reasons. First, in his book, *What Really Matters in College: Four Critical Years Revisited*, Astin (1993) focuses on student involvement variables and their relative impact on 82 different outcome measures; second, this study will provide an important resource in identifying the most relevant input and environmental variables for my study; and third, the results of Astin's (1993) study were based on a follow-up of freshmen who responded to an initial CIRP survey as entering freshmen. My study involves a follow-up of entering freshmen as well, the only difference being the years involved and the length of time covered by the follow-up. Astin's (1993) study was a 1989 follow-up of 1985 entering freshmen. This study will be a 1993 follow-up of 1973 through 1976 entering freshmen.

Student involvement theory implies a behavioral component that is defined as "the amount of physical and psychological energy that the student devotes to the academic experience" (Astin, 1985, p. 134). The types of student involvement activities include devoting considerable energy to studying, spending a lot of time on campus, participating actively in student organizations, athletics, and intramurals, and interacting with faculty members and other students (p. 134). "He

[Astin] sees in his theory elements of the Freudian notion of cathexis (the investment of psychological energy), as well [as] the learning theory concept of time-on-task" (Pascarella and Terenzini, 1991, p. 50).

The Input-Environment-Outcomes (I-E-O) Model: This model in conjunction with multivariate statistical analysis provides the framework for the analysis of the various input, environmental, and outcome variables chosen for this study (Astin, 1977, 1982, 1991, and 1993). The independent variables that make up the "input" portion of the model are usually referred to as the control variables. Although the influence of the input variables is important, as educational researchers we are most interested in measuring the change that is attributable to the independent variables that make up the "environment" portion of the model. The multivariate analysis of these variables will provide insights into the effects of college and post-college experiences. The controlling of input (and background) variables, improves the likelihood that the observed change can be legitimately attributed to the effects of those independent variables included in the environment.

For this study, the "environment" is represented by two distinct parts. The "initial" environmental phase relates to the time period that it takes students to finish their undergraduate degrees and includes the "bridge" and intermediate outcome variables explained above. This first phase represents the "undergraduate years" and is defined as a series of five year time spans (allows for up to five years to complete the undergraduate degree) for this study (1973-1978, 1974-1979, 1975-1980, and 1976-1981). The "second" environmental phase represents the post-college time period which is defined as the period from graduation with a bachelor's degree to the present. For this study, this second phase will represent a range in years from 12 to 17 years--takes into account the fact that some students may finish their undergraduate degrees in less than four years--(1976-1993, 1977-1993, 1978-1993, 1979-1993, 1980-1993, and 1981-1993).

Channeling: A concept important to interpreting the long term effects of college is what Astin (1977) refers to as "channeling." Undergraduate experiences impact students in different

ways, thus channeling them in a variety of directions. Three different classes of variables are involved when considering the channeling concept: (1) The variable that causes the student to be channeled (For this study, it is some form of involvement during the undergraduate years.); (2) The channel itself is represented by post-college involvement variables; and (3) The dependent variable, which is ultimately affected by post-college involvement. Channeling requires that two criteria be met: (1) Both the undergraduate and post-college variables have to be related significantly to the dependent variable after controlling for inputs; and (2) When the post-college variable enters the regression, it either eliminates or diminishes the undergraduate effect that causes the person to be channeled.

Channeling involves the mediating effects of post-college involvements such as graduate or professional school attendance, marriage, or early employment. In the jargon of path analysis, effects that can be explained by the mediation of channeling would be termed "indirect," while "direct" effects are those that persist even after the possible effects of channeling are taken into account.

Types of Outcomes: The specific long-term outcomes selected for this study include *advanced degree attainment and final career choice*. Career choice is being limited to specific careers in business, law, medicine/dentistry, and science-related careers. The science-related careers include math and engineering.

Advanced degree attainment was looked at initially as an outcome variable. For the career choice variable, it is included as an independent or an intermediate outcome variable. Prior studies have indicated that good undergraduate grades appear to count more in terms of an entree into relatively high status professions such as medicine and law, and they are more predictive of success in graduate business schools if they were earned in a relatively competitive arena (Pascarella and Terenzini, 1991). Bisconti and Solmon (1976) found, "The more selective the college, the *greater* the probability of finding one's college education useful in increasing the ability to think clearly, but the *smaller* the probability of finding it useful for providing knowledge

used in the current job. The findings probably reflect the fact that more selective or elite institutions tend to be more theoretical, whereas less selective institutions tend to be more practical in their approach" (p. 18).

In addition to college GPA, variables involving student-faculty interaction, including time spent talking to faculty outside of class and working on faculty research projects, had positive effects on degree aspirations. Also, positive correlates were observed for tutoring other students, participating in campus demonstrations, and socializing with students from different racial or ethnic groups, and the number of science and history courses taken (Astin, 1993, p. 267).

Hypothesis 1: *Undergraduate student involvement experiences, specifically student-student, student-faculty contact, as well as college GPA will have significant positive effects on advanced degree attainment.*

Only a few studies have looked specifically at the relationship between student involvement and **career choice**. A study by Weidman (1984), which was a 1969 follow-up of 1966 freshmen, found that extracurricular involvement had a small negative effect for male mathematics and female history majors and a small positive effect for female English majors (Pascarella and Terenzini, 1991, p. 476). Smart (1986) developed a social integration scale which included student-faculty interaction and extracurricular activities. According to Pascarella and Terenzini (1991), Smart (1986) found that "net of family socioeconomic status, sex, race, secondary school grades, precollege occupational aspirations, college selectivity, academic major, grades, and educational attainment, extent of social integration had no statistically significant direct effect on occupational status nine years after college enrollment. It did, however, have a statistically significant, positive indirect effect on occupational status, mediated primarily through educational attainment. Unfortunately, the measure of social integration tapped both interaction with faculty and extracurricular involvement, making it difficult to determine which component accounted for this effect" (p. 476).

A secondary question relates to gender differences and the potential influence of student involvement on decisions by female students to enter male dominated (sex-atypical) career fields. In the short term, evidence that "college major independently influences the likelihood that women will enter sex-atypical careers is convincing. Net of other factors, a sex-atypical major (one that attracts a high percentage of men, such as business or mathematics) enhances the likelihood of a woman entering a sex-atypical career" (Pascarella and Terenzini, 1991, p. 492).

A study by Ethington, Smart, and Pascarella (1988) attempted to determine whether or not the measure of social integration as defined by Smart (1986) influenced entry into sex-atypical careers. The study found a significantly positive relationship with regard to science-related career fields (Pascarella and Terenzini (1991). "The corresponding direct effect for sex-atypical careers in nonscience areas [business] was also positive, but it was statistically insignificant" (p. 476).

Hypothesis 2: *The involvement and channeling patterns for men and women are expected to operate differently in the traditional male dominated (sex-atypical) career fields (e.g., business, law, medicine and dentistry, and science-related careers).*

Advanced Degree Attainment

Hypothesis 1 states that: "undergraduate student involvement experiences, specifically student-student contact, student-faculty contact, as well as college GPA will have significant positive effects on advanced degree attainment." Advanced degrees include doctoral and professional degrees (J.D., M.D., Ph.D. etc.).

Student-Student Interaction: Table 1.1 shows the one student-student interaction variable that entered, as well as the two additional ones that were significant at the outset, but were reduced to non-significance as other variables entered the regression. In all cases these variables were, as hypothesized, positively associated with the dependent variable. The student-student interaction variable that actually entered the final equation was participation in student government. Both "worked on group projects in class" and "tutored another student" were

significant at the outset; however, the shared predictive power associated with earlier variables in the regression reduced both of these activities to non-significance. The "condition" of sharing predictive power is called multi-colinearity. As more variables enter the regression equation, the predictive power gets spread over an increasing number of variables, resulting in smaller and smaller regression coefficients and fewer that are statistically significant (Astin, 1991).

Table 1.1
Regression for all Respondents: *Advanced Degree Attainment* on Student-Student Involvement Activities/Experiences (N = 296)

			Beta After			
Step	Variable Name	Simple r	Input	Step 14	Step 15	Final Beta
	Variables Entering:					
15	Participate in Student Government	16*	10^	10^	10^	12^
	Variables Not Entering:					
--	Worked on Group Projects in Class	14^	07	03	03	03
--	Tutored Other Students	24*	11^	03	04	04

Note: ^ $p<0.05$; * $p<0.01$. Decimals before numbers have been omitted.

Student-Faculty Interaction: Table 1.2 provides a summary of the student-faculty

Table 1.2
Regression for all Respondents: *Advanced Degree Attainment* on Student-Faculty Involvement Activities/Experiences (N = 296)

			Beta After			
Step	Variable Name	Simple r	Input	Step 10	Step 11	Final Beta
	Variables Entering:					
10	Talking with Faculty Outside of Class	24*	18*	18*	20*	11^
	Variables Not Entering:					
--	Worked on Individual Research Project	18*	13^	08	09	06
--	Was a Guest in a Faculty Member's Home	16*	13^	06	07	07

Note: ^ $p<0.05$; * $p<0.01$. Decimals before numbers have been omitted.

interaction variables. At step 10, after the input and background variables have been controlled, "talking with faculty outside of class" enters the equation. The correlation coefficient at entry is 0.18, which is somewhat less than the simple correlation (0.24). This is an indication that students who are predisposed to getting doctorate and professional degrees at the point of entry to college are also predisposed to interact with the faculty. Two other student-faculty involvement variables were significant at the outset, but were later reduced to non-significance. In fact, both the "worked on an independent research project" and "was a guest in a faculty member's home" were still significant after all the input/background variables entered the regression. However, since both of these student-faculty activities share predictive power with talking with faculty outside of class, they were both reduced to non-significance once this latter activity entered the equation.

Academic-Related Involvement: Table 1.3 shows the academic involvement variables. Those that entered included: the number of science courses taken and time spent studying and doing homework. As hypothesized, both attributes are positively related to the dependent variable. Again, the smaller size of the "Beta after inputs" (compared to the

Table 1.3
Regression for all Respondents: *Advanced Degree Attainment* on Academic Involvement Activities/Experiences (N = 296)

			Beta After			
Step	Variable Name	Simple r	Input	Step 12	Step 14	Final Beta
	Variables Entering:					
12	Studying and Doing Homework	19*	13^	15*	16*	12^
14	Number of Science Courses Taken	29*	15*	11^	11^	11^

Note: ^ $p<0.05$; * $p<0.01$. Decimals before numbers have been omitted.

simple "r") shows that those students who are predisposed to getting a doctorate or professional degree at point of entry are also predisposed to taking science courses and spending more time

studying and doing homework. One additional variable, studying in the library, was originally hypothesized to be an "academic" variable, but since subsequent results suggested that it may be more of a "social" variable (see the ensuing discussion), it has been included in the next section as part of the social involvement discussion.

Social-Related Involvement: Table 1.4 shows the social involvement variables.

Table 1.4
Regression for all Respondents: *Advanced Degree Attainment* on Social-Related Involvement Activities/Experiences (N = 296)

			Beta After				
Step	Variable Name	Simple r	Input	Step 11	Step 13	Step 16	Final Beta
	Variables Entering:						
11	Studied in the Library	-16*	-10^	-13^	-19*	-19*	-16*
13	"Sociability" as an Undergraduate	01	09	09	12^	12^	15*
16	Participated in Volunteer Work	-04	-04	-07	-09	-11^	-10^

Note: ^ $p<0.05$; * $p<0.01$. Decimals before numbers have been omitted.

All three variables entered the regression equation and had significant final Betas; however, two of the variables had effects that were the opposite of what was hypothesized: studying in the library and the relative amount of time spent participating in volunteer work. Both of these had significant negative, rather than positive, effects on advanced degree attainment.

The social involvement variable with a significant positive final beta was the students' perception of their "sociability" compared to their fellow students. This variable had a non-significant simple correlation of less than 0.01. Rather than becoming smaller, the Beta increased to 0.12 by the time it entered the regression equation at step 13. The coefficient continued to increase as additional variables entered, resulting in a final Beta of 0.15. An increase in the size of a regression coefficient as new variables enter creates an effect opposite of the multi-colinearity condition explained earlier. This phenomenon is called the "suppressor" effect (Astin, 1991).

The second sizable increase in the correlation coefficient is related to studying in the library. Since this variable is negatively associated with the dependent variable as well, it is also positively associated with perceived social relationships with other students. Normally one would consider studying in the library an "academic" involvement activity; however, for the more serious student interested in obtaining an advanced degree, the library may have been seen as more of a social gathering place. This interpretation helps explain the negative relationship of this "academic" involvement variable to the dependent variable. The fact that the "popularity" self-rating is also positively associated with studying in the library reinforces the idea that the Pepperdine library in that era served, in part, a social function.

Participating in volunteer work has a pattern similar to studying in the library: it "suppresses" the positive effect of "sociability" and negatively influences advanced degree attainment. Clearly, individuals who perceive themselves as more social are also more likely to be involved in volunteer work.

Other Involvement Variables: Final college GPA and attending graduate school as an activity immediately after graduation are both highly correlated in a positive way to the dependent variable. As one might expect, attending graduate school immediately after graduation had the strongest simple correlation of all the variables. The value of this correlation had declined from its high of 0.34 to 0.18 by the time it entered on the 17th step. The simple correlation, the Beta after the inputs had entered, the Beta at entry, and the final Beta are shown in Table 1.5.

The small declines in the predictive power of College GPA after inputs are controlled does not necessarily diminish its importance; rather, it is simply sharing some of its predictive power with other involvement variables that are positively related to the outcome: talking to faculty outside of class, time spent studying and doing homework, and participating in volunteer activities. When they are controlled, these same involvement activities, as well as college GPA, reduce the predictive value of attending graduate school as well.

Table 1.5
Regression for all Respondents: *Advanced Degree Attainment* on Other Involvement Activities/Experiences (N = 296)

Step	Variable Name	Simple r	Beta After Input	Beta After Step 17	Beta After Step 18	Final Beta
	Variables Entering:					
17	Final College GPA	19*	19*	15*	13^	13^
18	Activities Immediately Following Graduation: Graduate School	34*	24*	18*	18*	18*

Note: ^ $p<0.05$; * $p<0.01$. Decimals before numbers have been omitted.

Summary: Degree Attainment: Undergraduate involvement is significantly and positively associated with obtaining an advanced degree after inputs are controlled. Specifically, the student's chances of obtaining an advanced degree after college appear to be enhanced by involvement with faculty, academic involvement, and academic achievement. The effect of social involvement with other students is less clear.

Career Choice

Hypothesis 2 states that: "the involvement and channeling patterns for women and men are expected to operate differently in the traditionally male dominated (sex-atypical) career fields (e.g., business, law, medicine and dentistry, and science-related careers)." There were not enough female respondents with careers in law, medicine, dentistry, and the sciences to permit regression runs and subsequent analysis either separately or combined for these careers. The analysis that follows thus focuses on comparisons between women and men who are currently working full-time in business careers.

The hypothesis is supported for women and men currently pursuing business careers. For women, it is not peer involvement, per se, at the undergraduate level, but primarily the majors/fields of study they chose that influence their career choice. For men, peer group involvement as undergraduates plays a much greater role in determining whether or not they end up in business careers.

Interaction Effects and Channeling

The primary foci for this hypothesis are an analysis of possible interactions between gender and involvement and a determination as to whether or not "channeling" takes place. Tables 2.1 and 2.2 provide the basis for studying these interaction effects.

Interaction Effects: Since different post-college variables can enter the separate gender regressions, this can impact the final Betas. Therefore, analyzing the differences in the "Betas after inputs" probably provides the best evidence of an interaction effect. The "direct" interaction effects are those with Beta coefficients (for either women or men) that remain significant at the final step. Looking at Table 2.1, the undergraduate variables that meet these criteria for women

Table 2.1
Undergraduate Involvement Predicting *Career Choice: Business* Among Women and Men

	Simple r		Beta After Inputs		Final Beta	
Description	Women	Men	Women	Men	Women	Men
Entered One or Both Gender Regressions:						
Partying	29*	23*	22*	18^	09	01
Discuss Crse. Content With Other Stu.	-21*	-04	-19^	03	-13	09
Worked Off Campus	20*	13	17^	06	19^	-03
Education Major	-28*	-02	-32*	03	-20^	06
Communication Major	40*	-05	32*	-07	19^	-07
Business Major	24*	32*	17^	28*	19^	10
Participated in Year-In-Europe Prog.	10	-27*	05	-22*	00	-15^
Number of Sciences Courses	-16	-26*	-06	-22*	-02	-04
Studied in the Library	09	17^	00	20*	05	19^
Studying/Doing Homework	-19^	-26*	-18^	-22*	-07	-12
Participate in Campus Affiliated Rel. Organ.	-20*	-20*	-17^	-17^	02	-19^
Number of Math Courses	00	22*	05	20*	13	11

Note: ^ $p<0.05$; * $p<0.01$. Decimals before numbers have been omitted.

are worked off campus, education major, and communication major. For men, the variables that meet these criteria are participated in the Year-In-Europe program and studied in the library.

The variable, worked off campus, has a positive effect among women choosing a business career. (This variable has no effect on men.) In other words, women who worked as undergraduates were also more likely to end up in business careers. It is possible that contacts that women establish while working as an undergraduate may lead to a career in business following graduation. Also, developing the "habit" of working while in college may increase the likelihood that women pursue a career after college rather than becoming homemakers (see the later analysis of post-college variables).

Majoring in communications has a positive effect among women and no effect among men. The area of communications offers many opportunities to pursue a career in business. Advertising and public relations are two fields of study that come under the umbrella of "communication major." Both advertising and public relations provide excellent backgrounds for any number of business-related careers. There is also the possibility that a communications major provided the best entree for women to get started in business related careers.

Participating in the Year-In-Europe program has a negative and significant effect on men and no effect on women. The negative effects of this experience makes sense for those individuals pursuing business careers. With the extensive course requirements for undergraduate business majors, this activity/experience was not a viable option for business majors since they couldn't get the needed courses and still graduate in four years if they participated in the year long program in Heidelberg, Germany. For men, it probably represented a self-selection process; that is, the male students who chose to spend a year abroad may have tended toward non-business careers.

Table 2.2 provides the simple correlations, Betas after inputs, and final Betas for the post-college variables that entered the separate gender regressions. The variable, went to work right after graduation, has a positive effect among women and no effect among men. The fact that this

variable is positively correlated with working off campus could mean that some women established themselves in "business" careers while still in college. Again, we have evidence that *early involvement in paid employment facilitates the entry of women in business careers.*

The variable, number of different employers, has a positive effect among women and no significant effect among men. Could it be that women are more likely to change jobs than their male classmates are because they are more likely to follow their spouses' careers?

Table 2.2
Post-College Involvement Predicting *Career Choice: Business* Among Women and Men

	Simple r		Beta After Inputs		Final Beta	
Description	Women	Men	Women	Men	Women	Men
Entered One or Both Gender Regressions:						
Went to Work After Graduation	34*	08	25*	07	16^	-07
Number of Different Employers	37*	14	32*	10	21*	-06
Advanced Degree: Prof./Doctorate	05	-36	07	-38*	06	-29*
Years on First Job	-34*	-39*	-23*	-33*	-11	-31*

Note: ^ $p<0.05$; * $p<0.01$. Decimals before numbers have been omitted.

Business careers for women appear to be more amenable to such changes than other careers. There is also the possibility that college career counselors in the mid- to late-seventies may have counseled women into entry level "business career" positions at the secretary or administrative assistant level just so these women could get their start in business.

The variable, advanced degree: professional/doctorate, has a negative effect on choosing a career in business among men. Obviously, men who obtain professional and doctoral degrees are effectively steered away from careers in business in favor of careers in law and medicine. Too few women in our sample (n=4) entered such careers to show a significant effect.

Channeling: The main channel for women appears to be whether or not they go to work after graduation. That is, women who do not go to work immediately after graduation are less likely to end up in a business career. The following variables appear to affect the woman student's likelihood of "channeling" into work immediately after graduation: Majoring in communications or business as well as working off campus. (The variable, discussing course content with other students, has a negative effect.) Finally, majoring in education is a "special case." Since it negatively affects women's pursuit of a business career, it effectively diverts (channels) women away from business and into education careers.

It appears that there are two possible channels for men. The earning of an advanced degree and number of years in first job. Years in first job may well be an artifact. That is, since a business career may require a number of job changes, it may be that men in the field of business spend fewer years on the first job simply because non-business careers require fewer job changes.

The "channel" that emerges most clearly from the data is obtaining a professional or doctoral degree. Since this variable is negatively related to pursuing a career in business, students who do not pursue advanced degrees appear more likely to end up in the field of business. This is thus a kind of channeling away from the field of business much like what was found with education majors among women. The activities/experiences that happen during the undergraduate years that tend to encourage students to pursue an advanced degree and steer ("channel") them away from potential careers in business are: the number of science courses taken, studying and doing homework, and participating in campus affiliated religious organizations. All have negative effects on pursuing a business career. (The variable, studied in the library, has a positive effect.)

Summary: Career Choice: The hypothesis is generally supported for careers in business. The involvement variables operate much differently for women than for men and considerable channeling takes place. Sample size precluded any analysis of careers in law, medicine/dentistry, and science, either separately or aggregated. For women, the undergraduate

involvement variables related primarily to undergraduate major (especially education) and secondarily to working while attending college.

For women, the two significant post-college variables--going to work immediately after graduation and the number of different employers--both have a positive influence on selecting a career in business. For men, two different post-college variables--earning an advanced degree and years on first job--both have negative direct effects on pursuing a career in business. The main channeling variable for women is going to work immediately after graduation. Women who go to work immediately after graduation are more likely to pursue business careers. For men, obtaining an advanced degree channels men away from business careers.

Conclusions

The results suggest that the theory of involvement is applicable over relatively long time periods, and that it can, and should be, extended to incorporate various forms of post-college involvement. In other words, when we think of the post-college period, we all too often think of outcomes (i.e., get a job, raise a family, earn a certain salary, etc.). Consequently, little thought has been given to treating the post-college period as another developmental period. The Idea of *channeling* basically is, in part, an attempt to look at the post-college period as a developmental period as well. It isn't that the student just goes to college and then following graduation achieves certain career outcomes or life outcomes, such as marriage, children, or whatever. This period also represents a learning and developmental period with learning occurring through various forms of post-college involvement.

In the career development area, this study underscores a number of gender differences that need to be considered when contemplating future studies involving career development theory. For example, if the findings from the study of women in business careers are generalizable to careers in law, medicine, dentistry, and the sciences, then it would appear that encouraging women to select particular majors as undergraduates will help to steer them toward these "atypical" career fields.

Limitations of the Study

This study has limited generalizability, since it was based on a follow-up of college graduates from one small liberal arts college in Southern California. An additional limitation is the size and make-up of the sample. For example, there were too few women respondents who are currently pursuing careers in male-dominated fields other than business: law, medicine, dentistry, and science-related fields.

The data for this study were collected at two points in time: when students entered the university during the 1973-76 time period and when they were followed up during the summer of 1993. The opportunity to measure the individuals at three different time periods would have been more ideal: One at entry, an initial follow-up right after the students finished their undergraduate degrees (so that retrospective recall would be less of an issue), and a second follow-up covering the present.

Future Research

The size and makeup of the sample precluded the detailed study of certain issues. For example, the lack of women in the law, medicine, dentistry, and science-related careers prevented any assessment of how undergraduate involvement might channel women into these traditionally male-dominated careers. If policy makers are serious about getting more women into these careers, future research with a larger and more diverse sample should address this issue specifically.

Another area for future research concerns the fact that this study was carried out in a single private residential college. Clearly, it is important to determine whether these findings can be replicated in other types of institutions, and especially in commuter institutions and large research-oriented institutions where student involvement is likely to be weaker.

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